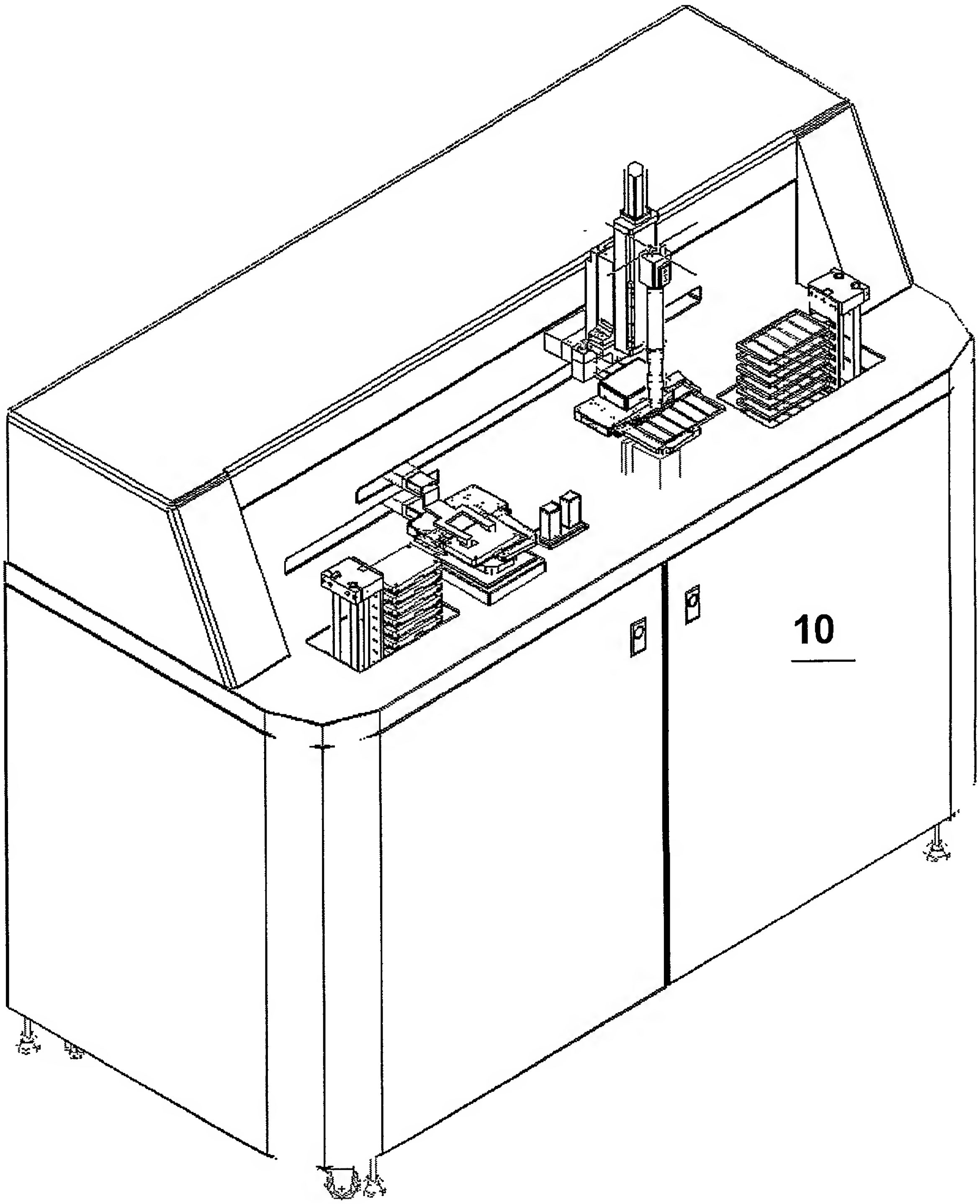


Figure 1

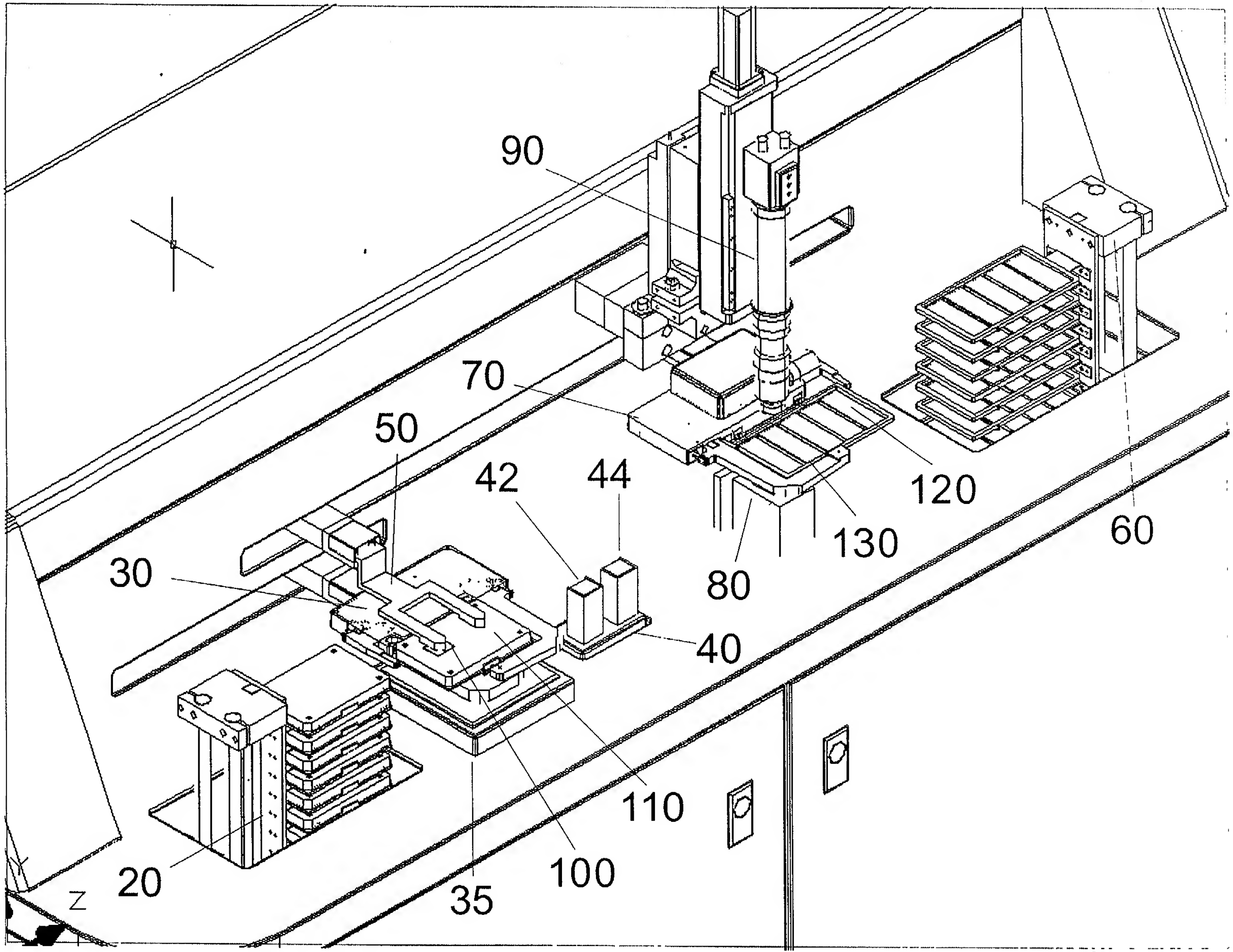


Figure 2

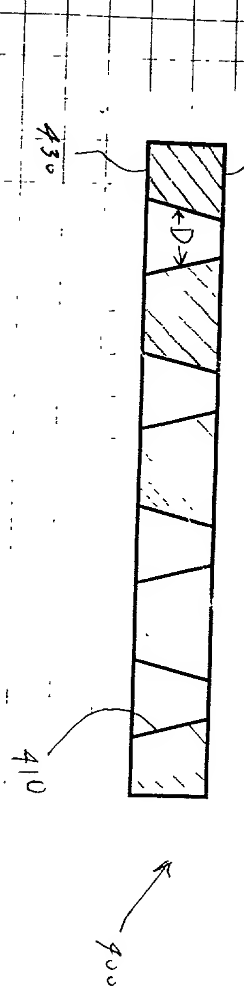


FIG. 4B

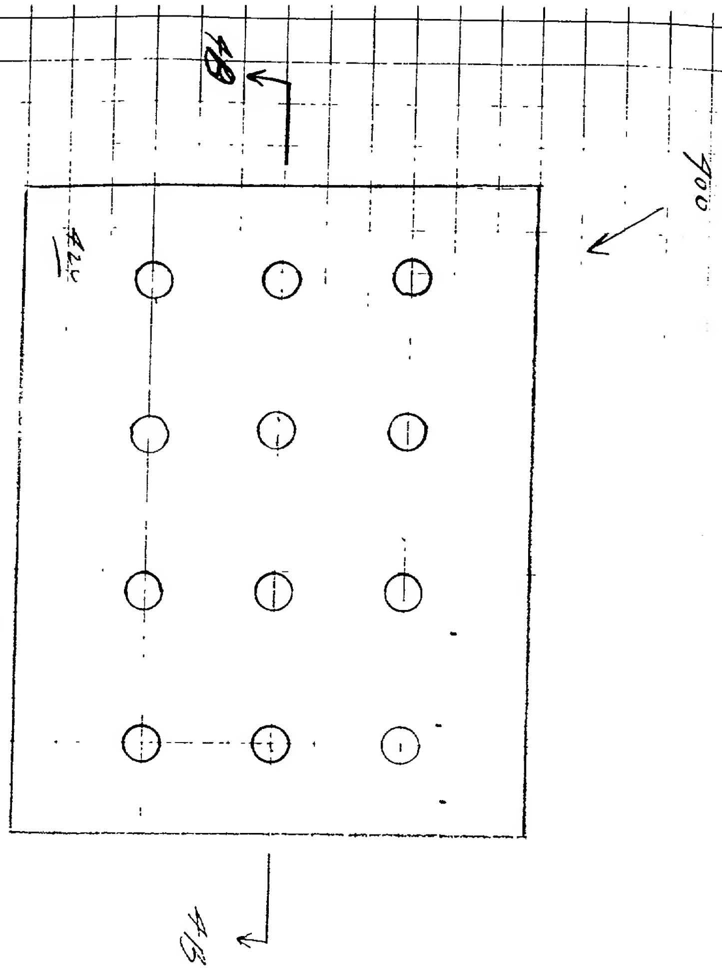


FIG. 4A

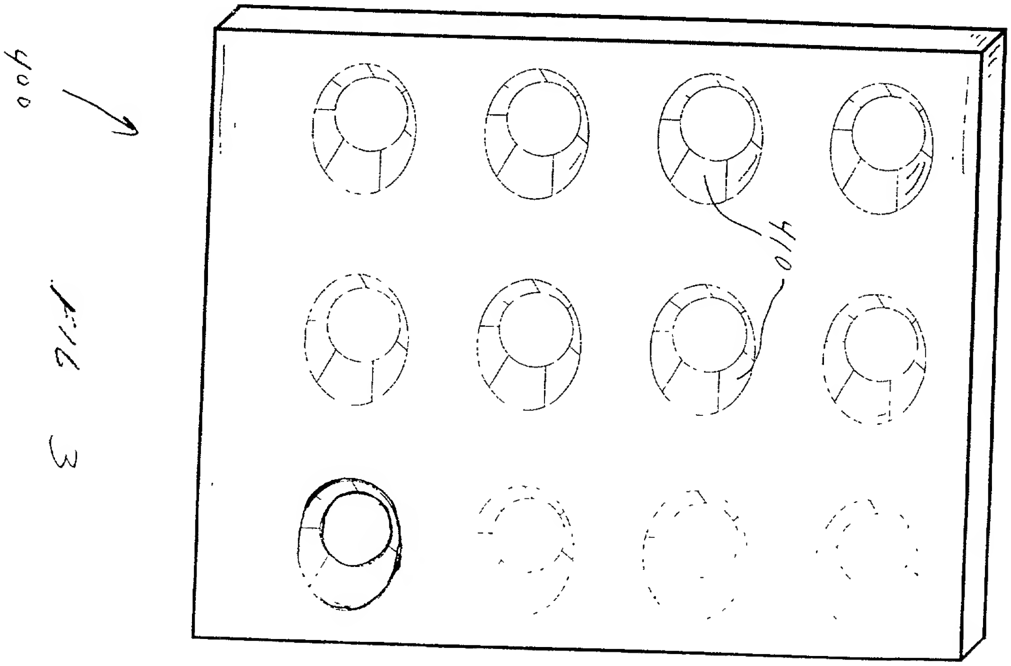


FIG 3

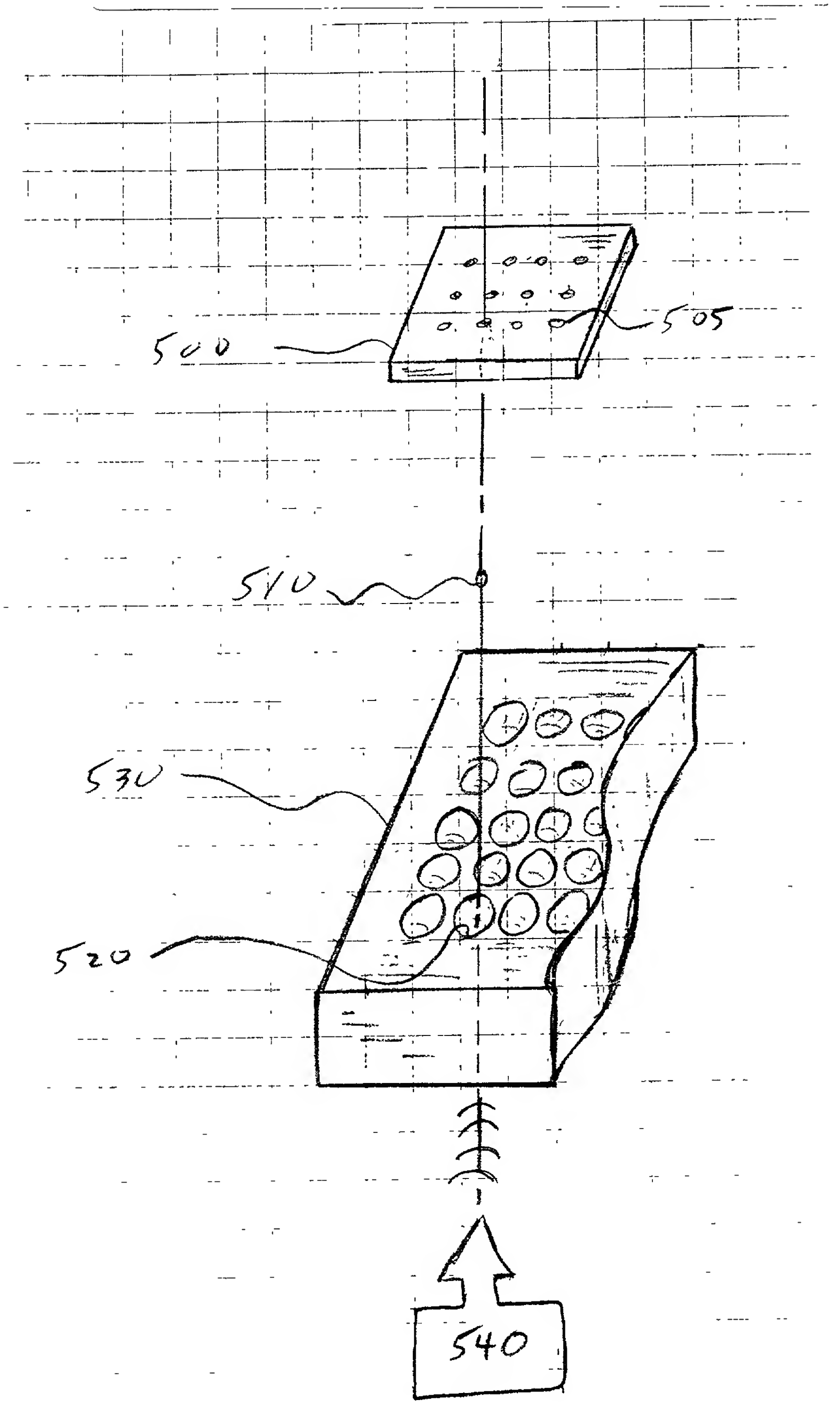


FIG 5

Title: APPARATUS AND METHOD FOR COMPOSING HIGH DENSITY MATERIALS ONTO TARGET SUBSTRATES BY A RAPID SEQUENCE
Inventor: Roger O. WILLIAMS
Application No.: To Be Assigned
Docket No.: 514542001500

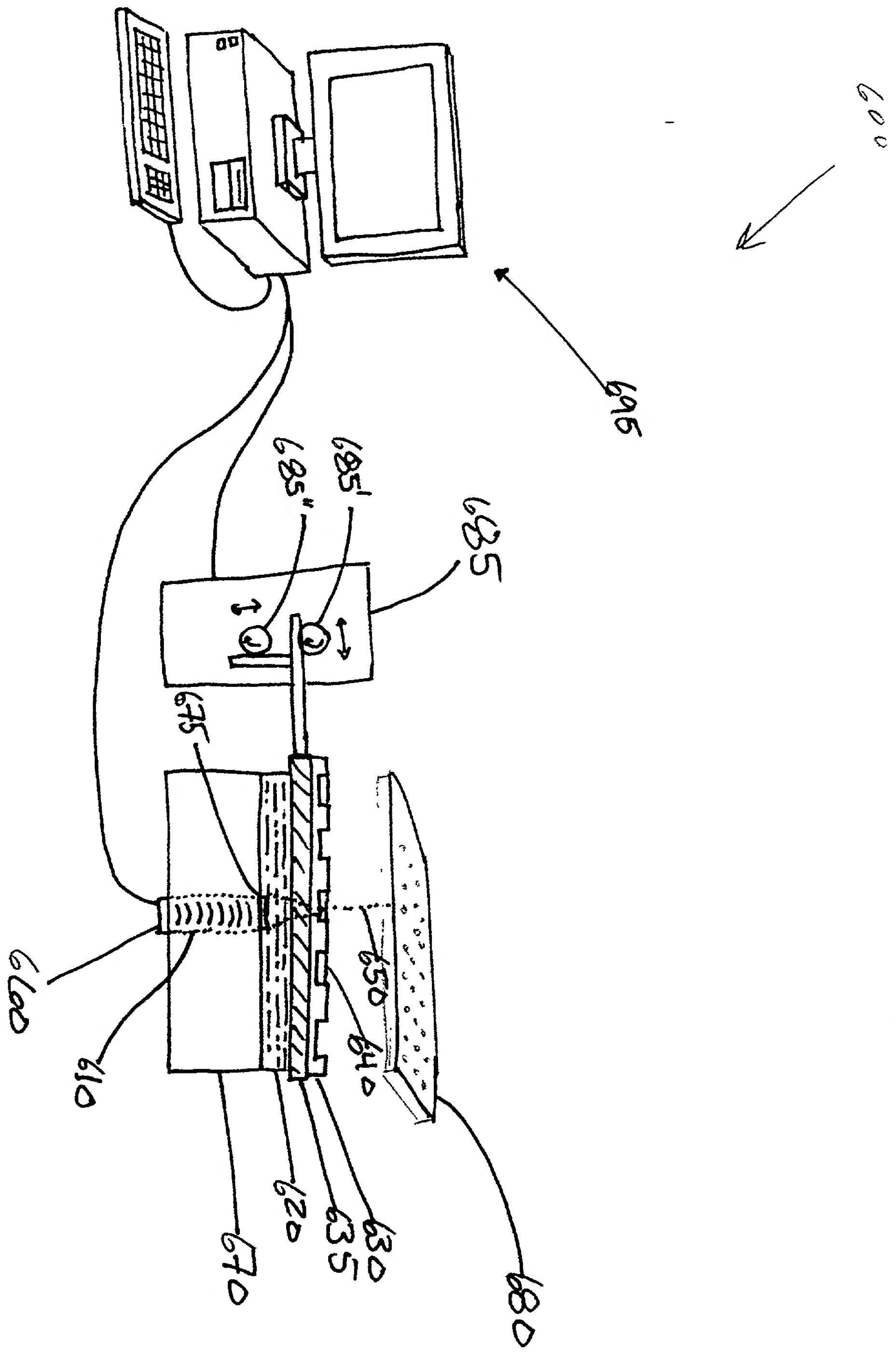


FIG. 6

Title: APPARATUS AND METHOD FOR COMPOSING HIGH DENSITY MATERIALS ONTO TARGET SUBSTRATES BY A RAPID SEQUENCE
Inventor: Roger O. WILLIAMS
Application No.: To Be Assigned
Docket No.: 514542001500

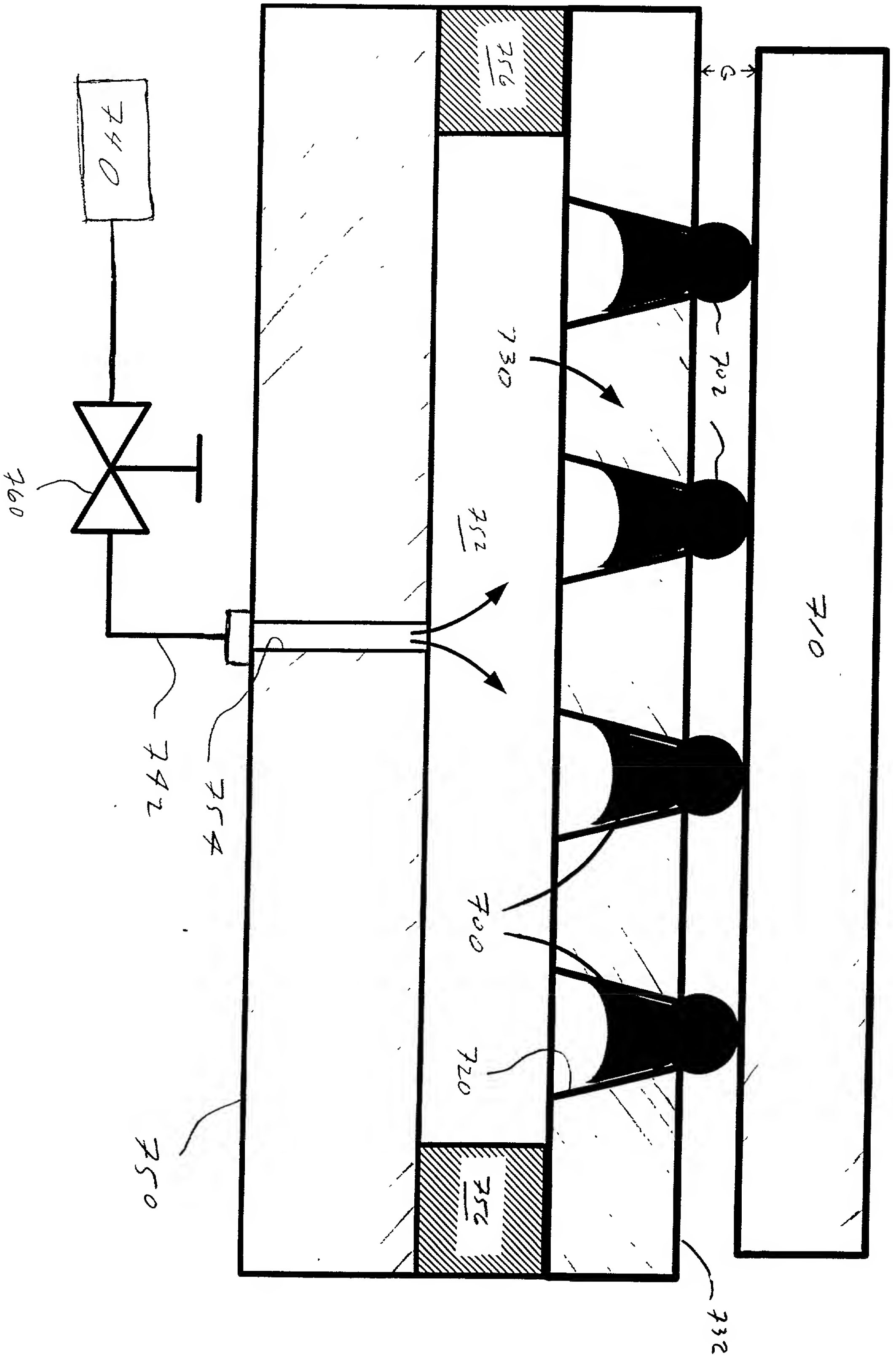
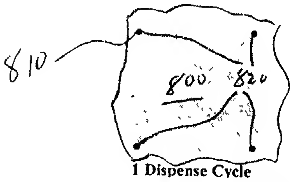


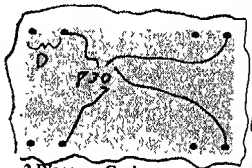
FIG 7

FIG.8A



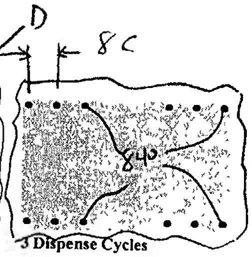
1 Dispense Cycle

8B



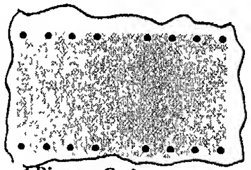
2 Dispense Cycles

8C



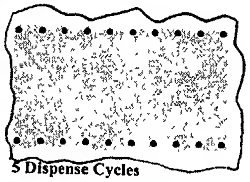
3 Dispense Cycles

8D



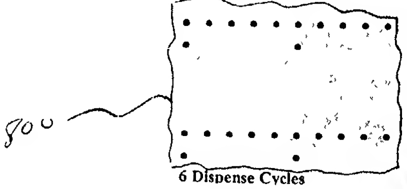
4 Dispense Cycles

8E



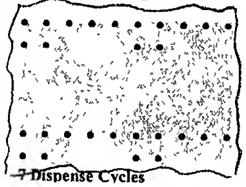
5 Dispense Cycles

FIG.8F



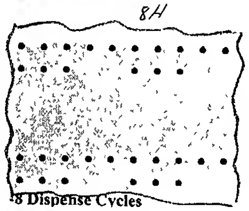
6 Dispense Cycles

8G



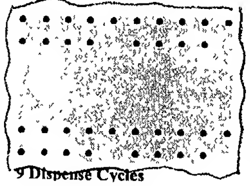
7 Dispense Cycles

8H



8 Dispense Cycles

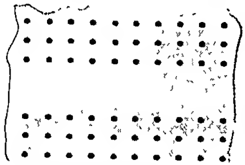
8I



9 Dispense Cycles

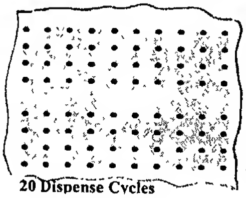
8J

10 Dispense Cycles



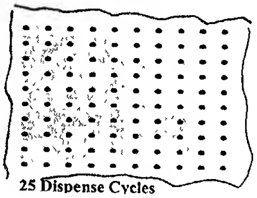
15 Dispense Cycles

FIG. 8K



20 Dispense Cycles

8L



25 Dispense Cycles

8M

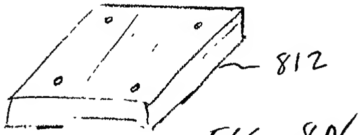


FIG. 8N

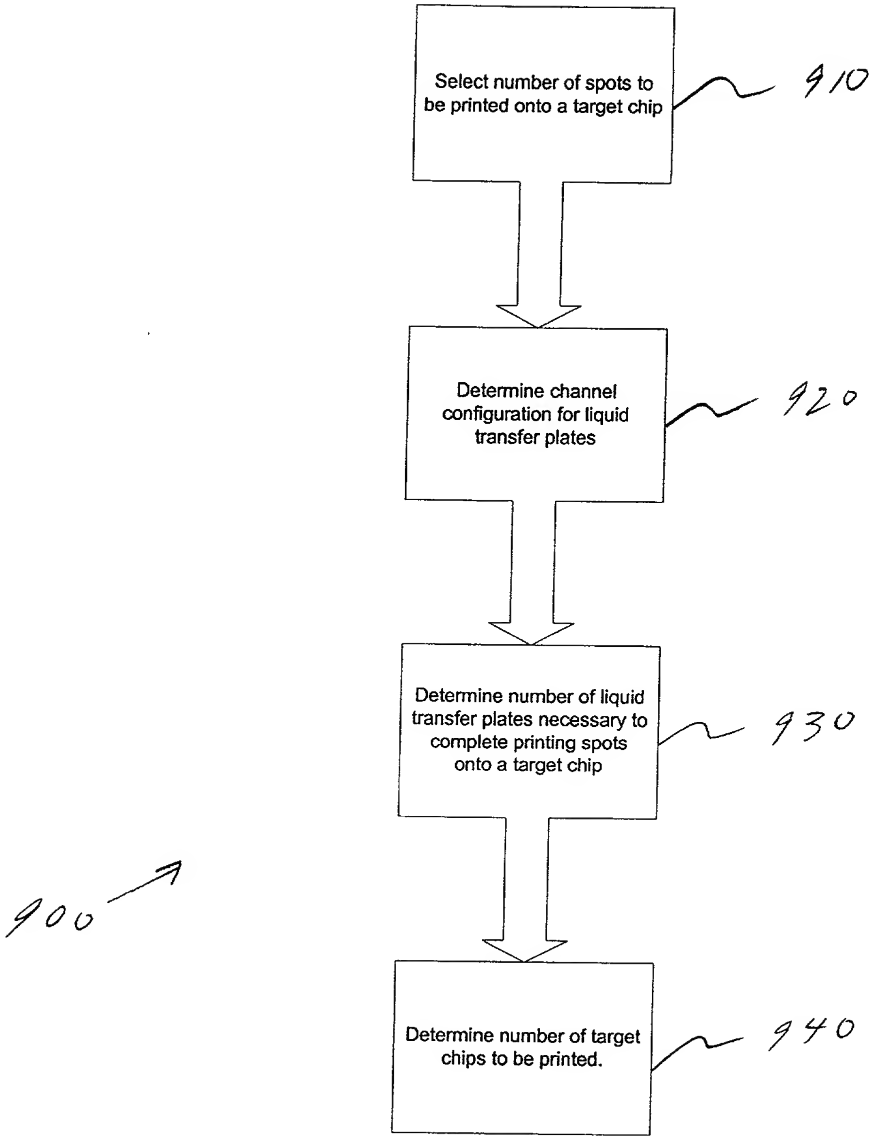

Select number of spots to be printed onto a target chip
910
Determine channel configuration for liquid transfer plates
920
Determine number of liquid transfer plates necessary to complete printing spots onto a target chip
930
900
Determine number of target chips to be printed.
940

FIG. 9A

10087529.022802

Title: APPARATUS AND METHOD FOR COMPOSING HIGH DENSITY MATERIALS ONTO TARGET SUBSTRATES BY A RAPID SEQUENCE
Inventor: Roger O. WILLIAMS
Application No.: To Be Assigned
Docket No.: 514542001500

Sheet 9 of 11

Nc		Nr Row	CX(mm		CY(mm)	Nc	Nr Row	CX(mm)		CY(mm)	Nc		Nr Row	CX(mm)		CY(mm)
20	X	1.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	0.9
20	X	2.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	1.8
20	X	3.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	2.7
20	X	4.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	3.6
20	X	6.0	18	X	5.4	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	4.5
20	X	7.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	5.4
20	X	8.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	6.3
20	X	9.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	7.2
20	X	10.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	8.1
20	X	12.0	18	X	10.8	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	9.0
20	X	14.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	10.8
20	X	16.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	12.6
20	X	18.0	18	X	16.2	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	13.5
20	X	19.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	14.4
20	X	20.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	15.3
20	X	21.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	16.2
20	X	24.0	18	X	21.6	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	18.0
20	X	26.4	N.A.	X	N.A.	22	[illegible]	19.8	X	21.6	24	X	[illegible]	21.6	X	19.8
20	X	28.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	21.6
20	X	31.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	23.4
20	X	33.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	25.2
20	X	36.0	18	X	32.4	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	27.0
20	X	38.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	28.8
20	X	40.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	30.6
20	X	43.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	32.4
20	X	48.0	18	X	43.2	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	36.0
20	X	50.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	37.8
20	X	52.8	N.A.	X	N.A.	22	[illegible]	19.8	X	43.2	24	X	[illegible]	21.6	X	39.6
20	X	55.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	41.4
20	X	57.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	48.0	21.6	X	43.2
20	X	60.0	18	X	54.0	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	45.0
20	X	62.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	46.8
20	X	64.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	48.6
20	X	67.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	50.4
20	X	69.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	52.2
20	X	72.0	18	X	64.8	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	54.0
20	X	74.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	55.8
20	X	76.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	57.6
20	X	79.2	N.A.	X	N.A.	22	[illegible]	19.8	X	64.8	24	X	[illegible]	21.6	X	59.4
20	X	81.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	61.2
20	X	84.0	18	X	75.6	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	63.0
20	X	86.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	64.8
20	X	88.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	66.6
20	X	91.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	68.4
20	X	93.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	70.2
20	X	96.0	18	X	86.4	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	72.0
20	X	100.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	75.6
20	X	103.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	77.4
20	X	105.6	N.A.	X	N.A.	22	[illegible]	19.8	X	86.4	24	X	[illegible]	21.6	X	79.2
20	X	108.0	18	X	97.2	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	81.0
20	X	110.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	82.8
20	X	112.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	84.6
20	X	115.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	86.4
20	X	117.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	88.2
20	X	120.0	18	X	108.0	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	90.0
20	X	122.4	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	91.8
20	X	124.8	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	93.6
20	X	127.2	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	95.4
20	X	129.6	N.A.	X	N.A.	22	[illegible]	N.A.	X	N.A.	24	X	[illegible]	21.6	X	97.2
20	X	132.0	18	X	118.8	22	[illegible]	19.8	X	108.0	24	X	[illegible]	21.6	X	99.0

FIG. 9B

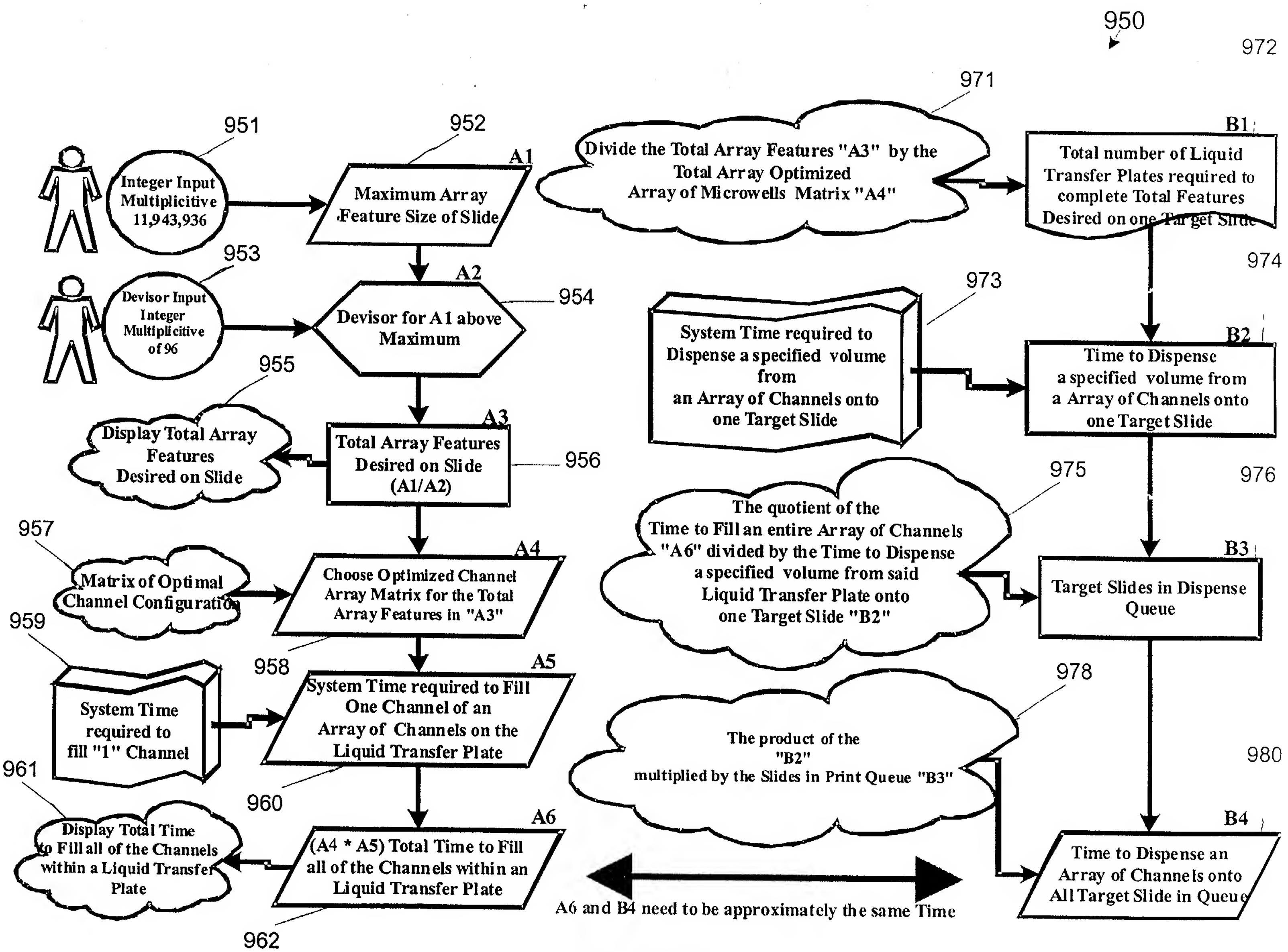

950
951
Integer Input Multiplicitive 11,943,936
952
A1
Maximum Array Feature Size of Slide
953
Devisor Input Integer Multiplicitive of 96
A2
Devisor for A1 above Maximum
954
955
Display Total Array Features Desired on Slide
A3
Total Array Features Desired on Slide (A1/A2)
956
957
Matrix of Optimal Channel Configuration
A4
Choose Optimized Channel Array Matrix for the Total Array Features in "A3"
958
959
System Time required to fill "1" Channel
A5
System Time required to Fill One Channel of an Array of Channels on the Liquid Transfer Plate
960
961
Display Total Time to Fill all of the Channels within a Liquid Transfer Plate
A6
(A4 * A5) Total Time to Fill all of the Channels within an Liquid Transfer Plate
962
971
Divide the Total Array Features "A3" by the Total Array Optimized Array of Microwells Matrix "A4"
972
B1
Total number of Liquid Transfer Plates required to complete Total Features Desired on one Target Slide
973
System Time required to Dispense a specified volume from an Array of Channels onto one Target Slide
974
B2
Time to Dispense a specified volume from a Array of Channels onto one Target Slide
975
The quotient of the Time to Fill an entire Array of Channels "A6" divided by the Time to Dispense a specified volume from said Liquid Transfer Plate onto one Target Slide "B2"
976
B3
Target Slides in Dispense Queue
978
The product of the "B2" multiplied by the Slides in Print Queue "B3"
980
B4
Time to Dispense an Array of Channels onto All Target Slide in Queue
A6 and B4 need to be approximately the same Time

Figure 9C

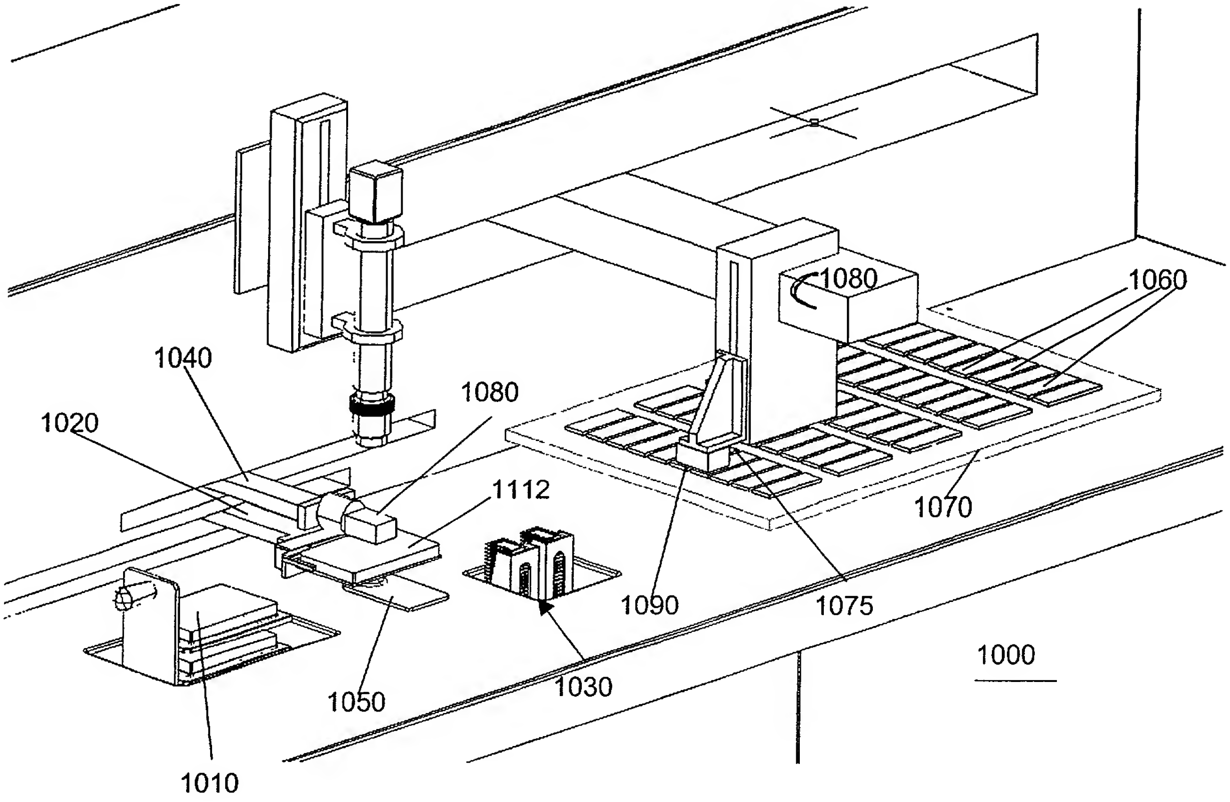


Figure 10A

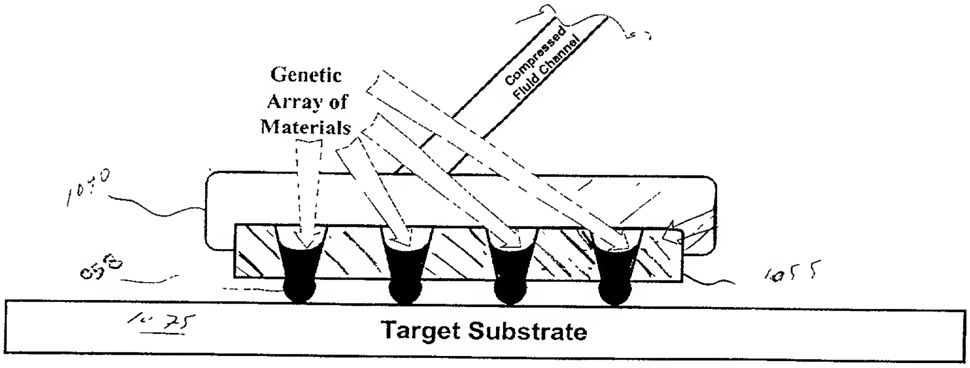


Figure 10B